AMENDMENTS TO THE CLAIMS

1-72. (Cancelled)

73. (New) A component mounting order optimization method executed before carrying out a component mounting operation in which a plurality of component supply parts are each to be disposed at a component holding position, each component supply part holding a plurality of components, with the component supply parts being arranged in parallel and arranged movably for supplying the components, and in which the components of the component supply parts are each to be transferred to a component mounting position, and in which each component is to be mounted to a corresponding mounting point on a corresponding circuit board of a plurality of circuit boards with the corresponding circuit board being disposed at the component mounting position by moving the corresponding circuit board in X-axis and Y-axis directions, the method comprising:

representing each mounting point in a three dimensional space with an X-axis component and a Y-axis component corresponding to a location on a surface of the corresponding circuit board, and with a Z-axis component being a Z-number corresponding to a location of a corresponding component supply part in a loading arrangement of the component supply parts, wherein the circuit boards are arranged along the Z-axis in accordance with Z-numbers of the component supply parts;

comparing (1) a length of a first component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in an initial loading arrangement, with (2) a length of a second component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in a modified loading arrangement, so as to determine a shorter of the first and second component mounting paths; and

determining an optimized loading arrangement of the component supply parts and a component mounting order on the circuit boards by adopting the loading arrangement corresponding to the shorter component mounting path so as to determine an optimized component mounting path.

74. (New) The component mounting order optimization method according to Claim 73, further comprising:

after said determining of the optimized loading arrangement, rearranging the loading arrangement of the component supply parts;

comparing a length of the optimized component mounting path with a length of a component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in the rearranged loading arrangement, so as to determine a shortest component mounting path; and

determining a further-optimized component mounting path by selecting the determined shortest component mounting path.

75. (New) The component mounting order optimization method according to Claim 73, wherein said determining of the optimized loading arrangement is carried out by temporarily arranging the component supply parts and correcting the temporary arrangement so as to thereafter determine the optimized component mounting path.

76. (New) The component mounting order optimization method according to Claim 75, wherein the temporary arranging of the component supply parts is executed by obtaining a product of variances of each of X and Y coordinate values and Z-numbers of the mounting points of the circuit boards while Z-numbers are changed, and then obtaining a loading arrangement of the component supply parts which reduces the variance product.

77. (New) The component mounting order optimization method according to Claim 76, wherein the obtaining of the loading arrangement which reduces the variance product smaller comprises:

obtaining a first variance product for a first loading arrangement of the component supply parts;

obtaining a second variance product for a second loading arrangement of the component

supply parts, the second loading arrangement being different from the first loading arrangement;

comparing the first variance product and the second variance product so as to determine a smaller of the compared variance products and setting the smaller of the compared variance products as the first variance product; and

repeating said obtaining of the second variance product and said comparing the first variance product so as to determine a substantially reduced variance product.

78. (New) The component mounting order optimization method according to Claim 76, wherein the correcting of the temporary arrangement of the component supply parts comprises:

after the temporary arranging of the component supply parts by obtaining the reduced variance product, changing a location of a second component supply part on a basis of a distance between a reference mounting position on a circuit board where a component supplied from a first component supply part adjacent to the component holding position is to be mounted and an object mounting position on the circuit board where a component supplied from the second component supply part is to be mounted, so as to further optimize the loading arrangement of the component supply parts.

79. (New) The component mounting order optimization method according to Claim 78, wherein the changing of the location of the second component supply part comprises:

obtaining the distance while the second component supply part is sequentially changed; and

arranging the second component supply part which corresponds to a shortest obtained distance at a position adjacent to the first component supply part.

80. (New) A component mounting order optimization program for making a computer execute a component mounting order optimization method in a component mounting operation in which a plurality of component supply parts are each to be disposed at a component holding position, each component supply part holding a plurality of components, with the component supply parts being arranged in parallel and arranged movably for supplying the components, and

in which the components of the component supply parts are each to be transferred to a component mounting position, and in which each component is to be mounted to a corresponding mounting point on a corresponding circuit board of a plurality of circuit boards with the corresponding circuit board being disposed at the component mounting position by moving the corresponding circuit board in X-axis and Y-axis directions, the program being recorded on a computer readable recording medium, the component mounting order optimization method comprising:

representing each mounting point in a three dimensional space with an X-axis component and a Y-axis component corresponding to a location on a surface of the corresponding circuit board, and with a Z-axis component being a Z-number corresponding to a location of a corresponding component supply part in a loading arrangement of the component supply parts, wherein the circuit boards are arranged along the Z-axis in accordance with Z-numbers of the component supply parts;

comparing (1) a length of a first component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in an initial loading arrangement, with (2) a length of a second component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in a modified loading arrangement, so as to determine a shorter of the first and second component mounting paths; and

determining an optimized loading arrangement of the component supply parts and a component mounting order on the circuit boards by adopting the loading arrangement corresponding to the shorter component mounting path so as to determine an optimized component mounting path.

81. (New) A computer readable recording medium having a program stored thereon for making a computer execute a component mounting order optimization method in a component mounting operation in which a plurality of component supply parts are each to be disposed at a component holding position, each component supply part holding a plurality of components, with the component supply parts being arranged in parallel and arranged movably for supplying the

components, and in which the components of the component supply parts are each to be transferred to a component mounting position, and in which each component is to be mounted to a corresponding mounting point on a corresponding circuit board of a plurality of circuit boards with the corresponding circuit board being disposed at the component mounting position by moving the corresponding circuit board in X-axis and Y-axis directions, the component mounting order optimization method comprising:

representing each mounting point in a three dimensional space with an X-axis component and a Y-axis component corresponding to a location on a surface of the corresponding circuit board, and with a Z-axis component being a Z-number corresponding to a location of a corresponding component supply part in a loading arrangement of the component supply parts, wherein the circuit boards are arranged along the Z-axis in accordance with Z-numbers of the component supply parts;

comparing (1) a length of a first component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in an initial loading arrangement, with (2) a length of a second component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in a modified loading arrangement, so as to determine a shorter of the first and second component mounting paths; and

determining an optimized loading arrangement of the component supply parts and a component mounting order on the circuit boards by adopting the loading arrangement corresponding to the shorter component mounting path so as to determine an optimized component mounting path.

82. (New) A component mounting apparatus comprising:

a component supply unit having a plurality of component supply parts, each component supply part holding a plurality of components, wherein the component supply parts are each to be disposed at a component holding position, the component supply parts being arranged in parallel and arranged movably for supplying the components;

a component shift device having a component holder, the component shift device being

operable to transfer the component holder between the component holding position and a component mounting position, the component shift device being arranged to hold the components supplied from the component supply parts by the component holder and to mount each component to a corresponding mounting point on a corresponding circuit board of a plurality of circuit boards, with the corresponding circuit board being disposed at the component mounting position;

an orthogonal table for holding the corresponding circuit board and moving the corresponding circuit board in X-axis and Y-axis directions; and

a controller for optimizing a mounting operation of the components, the controller including

an arrangement optimizing part for representing each mounting point in a three dimensional space with an X-axis component and a Y-axis component corresponding to a location on a surface of the corresponding circuit board, and with a Z-axis component being a Z-number corresponding to a location of a corresponding component supply part in a loading arrangement of the component supply parts, wherein the circuit boards are arranged along the Z-axis in accordance with Z-numbers of the component supply parts, and

a mounting path optimizing part for comparing (1) a length of a first component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in an initial loading arrangement, with (2) a length of a second component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in a modified loading arrangement, so as to determine a shorter of the first and second component mounting paths, wherein the mounting path optimizing part is operable to determine an optimized loading arrangement of the component supply parts and a component mounting order on the circuit boards by adopting the loading arrangement corresponding to the shorter component mounting path so as to determine an optimized component mounting path.